






Motivations for the use and consumption of wildlife products

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Abstract: The dominant approach to combating the illegal wildlife trade has traditionally been to restrict the supply of wildlife products. Yet conservationists increasingly recognize the importance of implementing demand-side interventions that target the end consumers in the trade chain. Their aim is to curb the consumption of wildlife or shift consumption to more sustainable alternatives. However, there are still considerable knowledge gaps in understanding of the diversity of consumer motivations in the context of illegal wildlife trade, which includes hundreds of thousands of species, different uses, and diverse contexts. Based on consultation with multiple experts from a diversity of backgrounds, nationalities, and focal taxa, we developed a typology of common motivations held by wildlife consumers that can be used to inform conservation interventions. We identified 5 main motivational categories for wildlife use: experiential, social, functional, financial, and spiritual, each containing subcategories. This framework is intended to facilitate the segmentation of consumers based on psychographics and allow the tailoring of interventions—whether behavior change campaigns, enforcement efforts, or incentive programs—to the specific context in which they will be used. Underlining the importance of consumer research and collaborating with local actors is an important step toward promoting a more systematic approach to the design of demand reduction interventions.

Keywords: behavior change, conservation social science, consumer research, demand reduction, illegal wildlife trade

Motivaciones para el Uso y Consumo de Productos de Fauna

Resumen: Tradicionalmente, la estrategia dominante para combatir el mercado ilegal de fauna ha sido restringir la oferta de productos de fauna. Aun así, los conservacionistas cada vez reconocen más la importancia de

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implementar intervenciones por el lado de la demanda que se enfoquen en los consumidores finales en la cadena de mercado. Su objetivo es reducir el consumo de fauna o redirigir ese consumo hacia alternativas más sustentables. Sin embargo, todavía existen vacíos de conocimiento en el entendimiento de la diversidad de motivos para los consumidores dentro del contexto del mercado ilegal de fauna, el cual incluye cientos de miles de especies, diferentes usos y contextos diversos. Con base en consultas a varios expertos con una diversidad de antecedentes, nacionalidades y taxones de enfoque desarrollamos una tipología de motivos comunes que tienen los consumidores de fauna que pueden usarse para orientar las intervenciones de conservación. Identificamos cinco categorías principales de motivos para el uso de fauna: vivencial, social, funcional, financiero y espiritual, cada uno con subcategorías. Este marco de trabajo tiene la intención de facilitar la segmentación de consumidores con base en psicográficos y permitir la personalización de las intervenciones — sean campañas de cambios en el comportamiento, esfuerzos por hacer cumplir las reglas o programas de incentivos — al contexto específico en el que serán utilizadas. Resaltar la importancia de los estudios de mercado y la colaboración con los actores locales es un paso importante hacia la promoción de una estrategia más sistemática para el diseño de intervenciones para reducir la demanda.

Palabras Clave: cambio en el comportamiento, ciencia social, conservación, estudio de mercado, mercado ilegal de fauna, reducción de demanda

摘要: 传统上,打击非法野生动植物贸易的主要方法是限制野生动植物制品的供应。然而,保护科学专家越来越认识到在贸易链的需求端针对终端消费者实施干预的重要性。其目标是遏制野生动植物的消费或将其转向更可持续的替代品消费。然而,在野生动植物非法贸易的背景下,对消费者动机多样性的理解仍然存在相当多的知识空白,因为这涉及大量的物种、不同的用途和复杂的背景。基于不同背景、国籍,关注不同类群的多位专家的讨论,本文发展出一套野生动植物消费者普遍消费动机的分类框架,可为保护的干预措施提供信息。本文区分了野生动植物使用的五个主要的动机类别:体验性、社会性、功能性、经济性和精神性,每个类别都包含子类别。该框架可用于基于心理特征进行的消费者人群划分,以及干预措施的调整(包括在行为改变活动、执法活动和激励项目中),使其适应特定情景。本文还强调消费者研究以及与当地行动者合作的重要性,朝着采用更系统的方法来设计减少需求的干预措施迈出重要一步。

关键词: 保护社会科学; 野生动物非法贸易; 减少需求; 行为改变; 消费者研究

Introduction

People have used and traded wild species for millennia, but there is increasing concern about overexploitation to supply commercial trade in wildlife (Hughes 2003; Challender & MacMillan 2014). Although many trade chains are sustainable and provide a range of benefits (e.g., Golden et al. 2014), illegal and unsustainable trade in wildlife threatens the future of many species (Milner-Gulland et al. 2003; Rosen & Smith 2010). This illegal trade is one of the largest and most lucrative international crimes, with impacts that extend beyond harming the directly traded species, including undermining local livelihoods and damaging ecosystem stability (Rosen & Smith 2010; Cardinale et al. 2012; 't Sas-Rolfes et al. 2019). Curtailing this trade is a major conservation priority (Rosen & Smith 2010; Challender et al. 2015) and an increasingly high-profile global issue, as recognized by the United Nations in 2017 (General Assembly resolution 71/326 [United Nations General Assembly 2017]).

The dominant approach to combating the illegal wildlife trade is based on restricting supply, through trade bans, improved customs checks, and antipoaching measures (Phelps et al. 2014). More recently, conservationists have recognized the importance of demand-side interventions targeting the end consumers (Veríssimo & Wan 2018), as highlighted in Decisions 17.44–17.48 at

the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) 17th Conference of the Parties (CITES Secretariat 2016). This is driving a focus on changing individual behavior, using approaches such as social marketing and environmental education to encourage people to stop consuming wildlife or choose more sustainable options (Veríssimo & Wan 2018; Veríssimo et al. 2018).

Interventions to reduce unsustainable wildlife demand should use insights from behavioral science fields, such as sociology, marketing, and psychology (Veríssimo et al. 2012) because better understanding of the drivers of consumption and the internal and external barriers to proconservation behaviors of consumers is needed. Improved understanding of these factors would allow conservationists to influence consumption patterns more effectively. The most effective interventions apply behavior change models to inform their design stage (Michie & Prestwich 2010; Atkin & Rice 2012), and a variety of relevant behavioral models are available, including the theory of planned behavior and the model of goal-directed behavior (Ajzen 1985; Perugini & Bagozzi 2001; Davis et al. 2015).

One widely used behavior change model is the capability, opportunity, motivation, behavior (COM-B) model (Michie et al. 2011). This model posits that behavior change depends on 3 components: capability (the

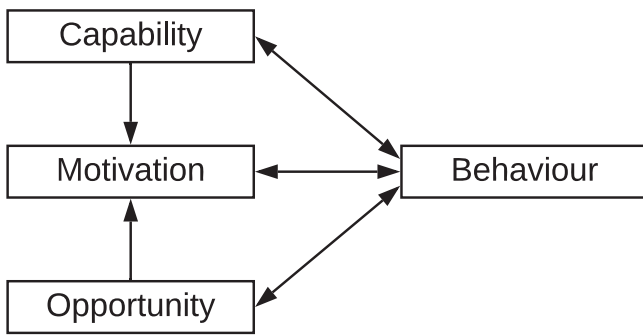


Figure 1. The capability, opportunity, motivation, behavior framework for understanding behavior (Michie et al. 2011).

physical and psychological ability to change), opportunity (a physical and social environment that is conducive to change), and motivation (positive personal beliefs and desires toward change) (Fig. 1). We focused on addressing key knowledge gaps around the third component, consumer motivation. We define *consumer motivation* as the drive to satisfy unmet needs and wants, whether physiological or psychological, through the acquisition of products (Pincus 2004). Understanding the underlying motivations driving the uses of specific products, along with the societal and cultural context in which they are consumed, allows for more effective behavior change interventions (Rothschild 1999; Michie et al. 2011).

The wildlife trade covers a wealth of species and uses. This ranges from rhinoceros horn consumed by Vietnamese businessmen as a signal of their social status (Truong et al. 2015), to bushmeat consumption in Gabon driven by the need for a healthy diet (Milner-Gulland et al. 2003), to illegally imported orchids used for ornamentation in China (Williams et al. 2018). Approaches for reducing demand must consider this diversity of motivations and uses, yet currently there is no taxonomy for motivations related to the wildlife trade.

We devised a typology of common motivations held by end consumers in the trade chain designed to inform conservation interventions and support more nuanced approaches to behavior change, such as the tailoring of interventions (e.g., behavior change campaigns, enforcement efforts, and incentive programs) to the specific context in which they will be used. We sought to highlight the diversity of demand for wildlife products, which necessitates a diversity in demand-reduction approaches. We reviewed work undertaken so far to catalogue motivations for wildlife use. We considered several example case studies, including trade in seahorses, songbirds, and orchids. We explored potential applications for our framework and the importance of identifying motivations as part of baseline research. We also

considered future research that would help guide intervention efforts.

Developing a Framework for Motivations in the Wildlife Trade

Despite previous research on consumers in the wildlife trade (e.g., Drury 2011; Shairp et al. 2016), consumer motivations are routinely overlooked, especially in relation to specific products. A typology of consumer roles described in Phelps et al. (2016) outlines the different uses for wildlife products and provides insights into the key actors in wildlife market chains. This focus on types of use differs from motivations for use, however, because people can use the same product in a similar way (e.g., eating and building) yet have very different motivations behind that usage. For example, pangolin (*Manidae*) meat may be consumed for subsistence in Ghana, but its consumption is predominantly for social status in Vietnam (Boakye et al. 2016; Shairp et al. 2016). Although the behaviors are superficially the same (consumption of pangolin meat), the differing motivations mean the 2 sets of consumers are highly unlikely to respond to the same intervention strategy.

Only a few studies have specifically looked at motivations. As part of acknowledging the complexity of demand, Ayling (2015) called for a more systematic approach to addressing wildlife consumers and highlighted examples, such as demand simply for personal pleasure. Burgess (2016) identified an initial framework of motivations, with 10 motivational clusters that influence wildlife product use around the world. Building on this, Thomas-Walters (2017) adapted these clusters, such as functional, into umbrella headings for other, more specific, motivations, such as medicinal and nutritional. However, this initial framework had gaps, particularly for common uses of plant products, such as fuel and housing and crafts. It also lacked validation by stakeholders with expertise outside of the East Asian cultural sphere.

For our work, we drew on these umbrella clusters to develop a comprehensive framework of motivations, establishing a more comprehensive framework that could be applied globally. This process involved iterative rounds of feedback from multiple wildlife trade experts from a diversity of backgrounds, nationalities, and focal species. These experts came from a range of social and natural science disciplines and were selected for their knowledge on key taxonomic groups, from orchids to pangolins, tropical timbers to sea turtles (Table 1). They came from academia, conservation practice, policy, and the private sector, and had worked in key consumer countries around the world, including in Asia, Europe, and North America.

Table 1. Areas of expertise represented by key stakeholders in an examination of motivations for the wildlife trade.

<i>Areas of expertise</i>	<i>Represented</i>
Sector	academia, e.g., researchers nongovernmental organizations, e.g., wildlife conservation charities business, e.g., commercial consulting policy, e.g., former civil servants
Species	mammals, e.g., saiga and pangolins birds, e.g., songbirds fish, e.g., sharks and arowana reptiles, e.g., sea turtles amphibians, e.g., Asian grass frogs plants, e.g., trees and orchids
Countries	Asia, e.g., China and Indonesia Europe, e.g., United Kingdom North America, e.g., United States South America, e.g., Trinidad and Tobago Africa, e.g., São Tomé and Príncipe and Tanzania Australia, e.g., New Zealand
Disciplines	natural sciences, e.g., ecology social sciences, e.g., anthropology, geography, government policy, international law and psychology interdisciplinary, e.g., conservation, marketing, and wildlife trade

The draft framework was developed by 5 of the coauthors, building on the previous typologies described above and then updated based on written feedback from another 10 experts. To refine the framework further, we held a workshop at the IWT (illegal wildlife trade) Evidence to Action 2018 symposium with approximately 30 participants (details in the Supporting Information). Ethics approval was granted by the University of Kent School Research Ethics Advisory Group (reference 10-PGR-18/19).

Wildlife Consumers Motivation Framework

We identified 5 main motivational categories for wildlife use: experiential, social, functional, financial, and spiritual, each containing subcategories (Fig. 2). Consumers driven by experiential motivations are seeking to fulfil hedonistic pleasure, provide novelty, or satisfy curiosity (Holbrook & Hirschman 1982; Baumgartner 2010). Social motivations entail the desire to form or strengthen social relationships. They may include conspicuous consumption to impress peers (Baumgartner 2010), where a product's expense signals the social class of the possessor. This increase in demand for high-priced goods is known as the snob effect in economics (Goodstein & Polasky 2014).

In contrast, functional motives rely on the practical use of a product or the function it performs (Sheth et al. 1991; Baumgartner 2010). In our typology, functional motives cover wildlife products acquired to fulfil an everyday purpose or function, such as hunger or heating. A related but distinct category is financial, where material goods are desired for the monetary value they may provide. Consumer research has paid little attention to profit-seeking purchases, but they are an important facet of consumption (Zhou & Pham 2004). Finally, the purchase of material goods is to fulfil spiritual needs or to bring protection, luck, or fortune in business and life (Richins 2005; Skousgaard 2006; Park & Baker 2007). These are often referred to as spiritual motivations, with resulting behaviors influenced by heritage, and potentially intended (whether consciously or not) to achieve a social function (Oman 2013).

We focused on motivations that drive demand for specific products, but acknowledge that there are a multitude of contextual and enabling factors that could also affect usage, such as habits, availability, and price.

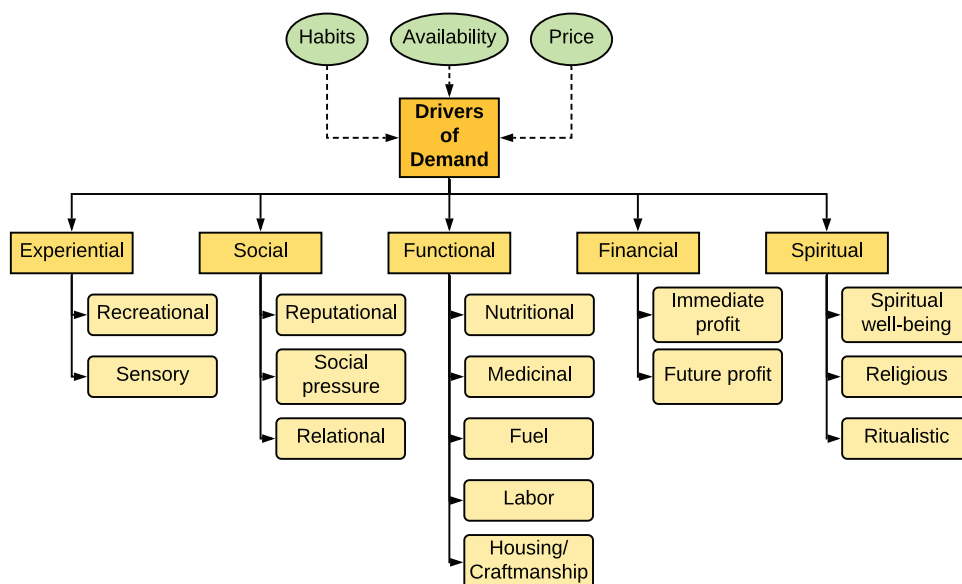


Figure 2. Framework overview for motivations behind the use of wildlife products.

Table 2. Detailed framework for the motivations behind the use of wildlife products.

<i>Category</i>	<i>Motivation</i>	<i>Examples</i>
Experiential	desire to fulfil hedonistic pleasure, provide novelty, or satisfy curiosity	
recreational	desire for leisure or pursuit of a pastime activity	musical instruments made from armadillo hide in Bolivia (Peredo 1999)
sensory	desire to please the senses, including aesthetic, olfactory, and tactile	appreciation for the feel or texture of animal fur (Downes 2018)
Social	desire to form or strengthen social relationships	
reputational	desire to give others a certain impression or to benefit socially or to gain currency in a business transaction or highlight social standing or wealth	rhinoceros horn given as a gift in Vietnam (Vu & Nielsen 2018)
social influence	direct influence from peers, family members, or those in influential positions, such as health professionals, or indirect influence through perceived socially normative behaviors and attitudes	social expectations driving the serving of shark fin soup at weddings (Cheung & Chang 2011)
relational	desire for companionship or for closeness to a larger social group or cultural or national identity	pet ownership (Bush et al. 2014)
Functional	need to fulfil an everyday purpose or function	
nutritional	desire to fulfil a dietary need (e.g., protein or food) for people, livestock, or pets	wild caught fish traded globally (Pauly et al. 2002)
medicinal	desire to treat an illness or promote wellness (i.e., curative or preventative)	<i>Cordyceps</i> caterpillar fungus traded as medicine in China (Holliday & Cleaver 2008)
fuel	need to cook or generate heat	acacia wood sold from East Africa for charcoal (Okello et al. 2001)
housing and crafts	desire for shelter, clothing, and other practical items	iroko tree used in Benin to build furniture (Ouinavi et al. 2005)
abor	desire to exploit the labor of working animals	working elephants in Myanmar (Leimgruber et al. 2008)
Financial	desire for financial gain	
immediate profit	desire to generate income	slow loris used to sell selfies in Turkey (Kitson & Nekaris 2017)
future profit	desire for future profit or an investment strategy	ivory used as an investment in China (Gao & Clark 2014)
Spiritual	desire to fulfil spiritual needs, or bring protection, luck, or fortune in business and life; sometimes interlinked with cultural practices	
spiritual well being	desire to improve one's fortune in this life or any other lives	ornamental fish used to improve feng shui (Ng 2016)
religious	desire to practice, engage, or signal an affiliation with an organized religion or spiritual belief	lansan tree resin used to make incense for religious services in St. Lucia (Daltry et al. 2015)
ritualistic	desire to practice rituals or traditions	songbirds bought as a rite of passage for young men in Indonesia (Anggraini 2017)

For instance, someone may desire tiger bones for a traditional remedy but be unable to purchase any, so they opt to buy lion bone instead. In this case, availability has affected the consumer's decisions, but the underlying motivational driver is still medicinal. Similarly, a large number of people in both Vietnam and China value ivory for its ornamental qualities, but use is much lower in Vietnam because potential consumers currently lack the financial means to buy it (National Geographic & GlobeScan 2015). A detailed description of

the behaviors driven by the different motivations is in Table 2.

When applying this framework, 3 key aspects need to be considered. First, our framework is a multivariate rather than a discriminant typology. Although the motivational categories are discrete, products may well be used for multiple reasons and thus conservationists should not use this framework to pigeonhole consumers, who may be driven by multiple motivations. For example, one of the largest threats to songbirds (Passeriformes) in

Southeast Asia is the capture of wild birds to be kept as pets (Souto et al. 2017), particularly in Indonesia (Burivalova et al. 2017; Bergin et al. 2018). These birds are highly valued for their beauty and singing ability (Regueira & Bernard, 2012). They are entered into songbird competitions, and winners receive both social status and monetary prizes (Jepson et al. 2011). The ownership of a songbird is also considered a rite of passage for young men in some parts of Indonesia (Anggraini 2017). Each of these motivations is distinct, but they may be simultaneously held by consumers (Fig. 3a). Moreover, although each of these motivations is distinct, some are more pressing than others. In such cases, techniques for examining the attributes that influence consumer choice can help quantify the relative strength of different motivations (Hanley et al. 2002). For example, choice modeling, a stated preference method, works on the assumption that participants in a hypothetical market situation will choose products that provide them the highest level of utility, revealing which attributes different consumer segments most value (Hinsley et al. 2015; Shairp et al. 2016).

The second consideration is that although some motivational categories (e.g., financial gain) may apply to multiple trade chain actors, our focus on end consumers means that care is needed to understand which groups are actually driving demand. For example, seahorses (*Hippocampus* spp.) are used globally in traditional medicine (Fig. 3b), with the largest demand coming from China and Taiwan (Foster et al. 2019). Dried seahorses are used as a remedy for a variety of medical conditions in traditional Chinese medicine (TCM), including sexual dysfunction and difficult childbirth (Rosa & Defavari 2013). If a Chinese man visited a TCM practitioner for an arthritis treatment and was prescribed dried seahorses, then the demand for seahorses is not necessarily coming from the patient. If he just wished to have a generic remedy and was happy to take whatever he was prescribed, then the species-specific demand would actually be coming from the TCM practitioner. It may therefore be more effective to target these intermediaries in the trade chain rather than the consumer himself. This example of mediated demand is different from someone who specifically requests seahorses because of a belief in their curative properties, which is where our framework would be of use in consumer segmentation.

The third consideration relates to the COM-B model, which recognizes that motivation is only one of the factors that enable behavior change (Michie et al. 2011). Thus, although it is always important to understand motivations, in some cases it will be more effective to use structural or legal interventions that target capability and opportunity (Rothschild 1999). For example, there is great demand by international consumers for orchids (Hinsley et al. 2017). People buy these plants as a hobby and out of an aesthetic appreciation for their beauty

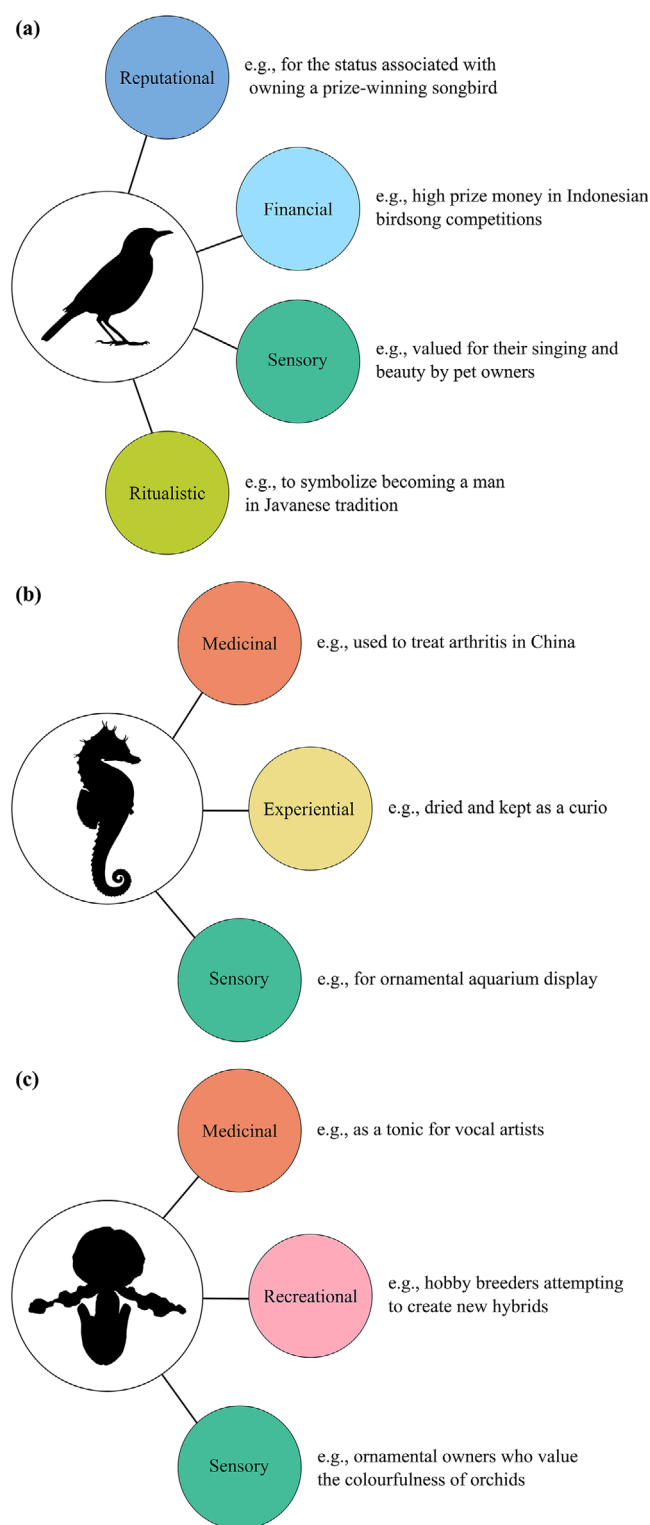


Figure 3. Motivations associated with the purchase of (a) songbirds (Jepson et al. 2011; Regueira & Bernard 2012; Anggraini 2017; Souto et al. 2017), (b) seahorses (Martin-Smith & Vincent 2006; Kumaravel et al. 2012; Foster et al. 2019), and (c) wild-sourced orchids (Liu et al. 2014; Hinsley et al. 2017; Williams et al. 2018).

(Fig. 3c). In some cases, plants are illegally supplied from the wild, and so conservationists may seek to tackle the problem through a demand reduction intervention. However, research on consumers shows that for collectors in China, colorfulness is a larger motivator than origin (Williams et al. 2018). Therefore, a more cost-effective conservation strategy may involve facilitating artificial propagation of more colorful orchids or improving enforcement so as to increase the costs and barriers of importing wild-sourced plants. Care should also be taken to avoid negative, unintended consequences stemming from the use of inappropriate interventions (Thomas-Walters et al. 2020).

Framework Applications

There are 2 key ways our framework could contribute to the conservation of illegally traded species. First, it allows the segmentation of target consumers by motivation. In social marketing, for instance, segmentation is used because people with comparable attributes generally respond similarly to different messaging strategies (Nisbet & Scheufele 2009; Graham & Abrahamse 2017), allowing for more focused and efficient interventions (as opposed to a traditional one-size-fits-all approach). Demand reduction interventions in conservation rarely attempt this step (Greenfield & Veríssimo 2018), but when they do, they frequently classify people by demographic variables, such as age and gender. Segmentation based only on demographics, however, largely neglects the psychographic profiling of customers that can provide more useful information (Lin 2002). The health sector has recognized the value of psychographics (the study of personality, values, and motivations) for connecting with target audiences (Boslaugh et al. 2005), and there are strong parallels with the design of behavior change interventions in conservation, for example, the use of the COM-B model in understanding undesirable consumer behaviors (Atkins & Michie 2013).

Such segmentation is also important to the design and enforcement of legal-regulatory frameworks targeting consumers. For example, the effectiveness of enforcement measures is also likely to differ across motivations. For example, enforcement of rules that conflict with deeply held spiritual motivations may be significantly challenging. The willingness of officials to enforce laws that contradict their own deep-rooted beliefs should also be considered when designing interventions because evidence suggests that imposing strict laws that conflict strongly with prevailing social norms may backfire (Acemoglu & Jackson 2017). These broader examples underline the importance of baseline research to identify the main motivations among consumers in each market. Where possible, motivations may even be quantified using economic concepts such as utility theory (Goodstein

& Polasky 2014). However, it is important that such work accounts for researcher and practitioner bias, especially when conservationists have different practices and beliefs from the target audience. In these situations, conservationists undertaking consumer research to understand the audience's perspective and motivations should collaborate with local actors.

A second application for our framework is in the design of novel research and interventions. For instance, it could be adopted when evaluating the success of addressing different motivations for consumption and identifying the most influential motivators for specific groups (Burgess 2016; Thomas-Walters 2017). Another as-yet unexplored avenue for future research is the potential for shared messaging strategies or whole interventions that target products purchased by the same consumer group due to the same motivations (Burgess 2016). For example, if a consumer group desired both ivory and rosewood for their aesthetic qualities and the prestige associated with owning them, then 1 intervention could successfully target both behaviors or the same strategy could be used consecutively on the same group to target each behavior. The former approach is supported by related research on behavioral spillovers, which has shown that changing one behavior can sometimes lead to alterations in other, similar behaviors (Truelove et al. 2014). Harnessing shared motivations to address consumption of multiple products within a single intervention would be of enormous value in conservation, where funds and resources are often limited (Bottrill et al. 2008; McDonald-Madden et al. 2008).

By mapping out motivations, conservation practitioners and researchers clarify the complexity of both individual wildlife product usage and the wildlife trade overall. This underlines the importance of consumer research, which is lacking for most demand reduction interventions (Greenfield & Veríssimo 2018). Our analysis provides a broad, globally applicable framework that can underpin the development of a common language for wildlife trade research, making it easier for practitioners and researchers to identify relevant previous studies that could inform potential future interventions. Thus, it is an important step toward producing a more systematic approach to designing effective demand reduction interventions.

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Supporting Information

Methodology details (Appendix S1) are available online. The authors are solely responsible for the content and functionality of these materials. Queries (other than absence of the material) should be directed to the corresponding author.

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